symmetrically aligned around an axis-symmetrical alignment central axis in each of a plurality of pixel regions under application of a driving voltage,

convex portions defining the pixel region are provided on a surface of at least one of the substrates on the liquid crystal layer side, and a treatment for controlling a position of the axis-symmetrical alignment central axis is conducted,

each pixel region includes an Sb region in which the liquid crystal molecules keep a homeotropic alignment state under application of an axis-symmetrical alignment central axis forming voltage at each predetermined position, and

an axis-symmetrical alignment central axis forming portion at a predetermined position in each of the plurality of pixel regions, and the axis-symmetrical alignment central axis of the liquid crystal molecules corresponds to the axis-symmetrical alignment central axis forming portion,

wherein the Sb region is an area aligned with the axis-symmetrical alignment central axis forming portion, A is an area of the pixel region, and Sb/A satisfies the relationship $0 < Sb/A < 4\%$.

REMARKS

Reconsideration of this application is respectfully requested. The indication of allowability of dependent claims 24 and 26 is appreciated. These claims have been rewritten into independent form and should be in clear condition for allowance.

The acknowledgement of receipt of all the priority documents is appreciated.

Acknowledgement is requested of the references submitted with the preliminary amendment on December 21, 2001, and listed on the Notice of References Cited from the

parent application. Attached are copies of the two pages of Notice of References Cited that were previously submitted.

The rejection of claims 1-6, 22, 23, 25 and 27-31 as being anticipated by Horie et al. (JP 8-292423) is traversed. Horie does not disclose a liquid crystal display (LCD) having liquid crystal model molecules that are "aligned in a direction substantially vertical to the substrates when no voltage is being applied". In contrast, Horie teaches that the liquid crystal molecules are vertical to the substrate only when voltage is applied. See, e.g., Horie U.S. Patent No. 6,061,117, column 17, lines 14-21. (Horie '117 U.S. Patent corresponds to Horie published Japanese application 8-292423). Because Horie does not teach vertical aligned liquid crystal molecules when no voltage is applied to the substrates, Horie does not teach the same invention that is recited in the claims of this application.

Further, independent claim 1 has been amended to incorporate the limitation of former claim 2. As amended, claim 1 makes clear that the liquid crystal layer is thickest about a pixel region to assist in providing axial symmetrical orientation for the vertically aligned liquid crystal molecules when no voltage is applied. Accordingly, there is no anticipation because Horie does not disclose the same devices as is being claimed here.

The rejection for obviousness of claims 7 and 8 based on Horie in view of Yamada is traversed. Horie and Yamada do not disclose or suggest vertically aligned liquid crystal molecules when no voltage is applied. Further, Yamada is a patent commonly owned with this application and thus is not applicable as 102(e) prior art for purposes of

this obviousness rejection. Accordingly, the rejection of claims 6 and 7 should be withdrawn.

All claims are in good condition for allowance. If any small matter remains outstanding, the Examiner is requested to telephone applicants' attorney. Prompt reconsideration and allowance of this application is requested.

Attached hereto is a marked-up version of the changes made to the specification and claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made**."

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A liquid crystal display device comprising a pair of substrates and a liquid crystal layer provided between the substrates, wherein liquid crystal molecules in the liquid crystal layer have a negative dielectric anisotropy, and the liquid crystal molecules are aligned in a direction substantially vertical to the substrates when no voltage is being applied and axis-symmetrically aligned in each of a plurality of pixel regions under application of a voltage, wherein a thickness (d_{in}) of the liquid crystal layer in the pixel region is larger than a thickness (d_{out}) of the liquid crystal layer outside of the pixel region, and the device includes a homeotropic alignment layer in a region corresponding to the pixel region on a surface of at least one of the substrates on the liquid crystal layer side.

3. (Amended) A liquid crystal display device according to claim [2] 1, wherein at least one of the substrates has convex portions defining the pixel region on a surface on the liquid crystal layer side.

22. (Amended) A liquid crystal display device, comprising:

a pair of substrates and a liquid crystal layer provided between the substrates,

wherein liquid crystal molecules in the liquid crystal layer have a negative dielectric anisotropy, and the liquid crystal molecules are aligned in a direction substantially vertical to the substrates when no driving voltage is being applied and axis-

symmetrically aligned around an axis-symmetrical alignment central axis in each of a plurality of pixel regions under application of a driving voltage, and

a convex [portions] portion defining each of the pixel [region are] regions is provided on a surface of at least one of the substrates on the liquid crystal layer side, and said convex portion includes a treatment for controlling a position of the axis-symmetrical alignment central axis [is conducted].

24. A liquid crystal display device [according to claim 23,] comprising:

a pair of substrates and a liquid crystal layer provided between the substrates,

wherein liquid crystal molecules in the liquid crystal layer have a negative dielectric anisotropy, and the liquid crystal molecules are aligned in a direction substantially vertical to the substrates when no driving voltage is being applied and axis-symmetrically aligned around an axis-symmetrical alignment central axis in each of a plurality of pixel regions under application of a driving voltage, and

a convex portion defining each of the pixel regions is provided on a surface of at least one of the substrates on the liquid crystal layer side, and said convex portion includes a treatment for controlling a position of the axis-symmetrical alignment central axis, and

each pixel region includes an Sa region in which the liquid crystal molecules keep a homeotropic alignment state under application of an axis-symmetrical alignment central axis forming voltage,

wherein the Sa region is an area of the pixel region in which the liquid crystal molecules keep a homeotropic alignment state under the application of the axis-

symmetrical alignment central axis forming voltage, A is an area of the pixel region, and Sa/A satisfies the relationship $0 < Sa/A < 4\%$.

26. A liquid crystal display device [according to claim 25,] comprising:

a pair of substrates and a liquid crystal layer provided between the substrates,

wherein liquid crystal molecules in the liquid crystal layer have a negative dielectric anisotropy, and the liquid crystal molecules are aligned in a direction substantially vertical to the substrates when no driving voltage is being applied and axis-symmetrically aligned around an axis-symmetrical alignment central axis in each of a plurality of pixel regions under application of a driving voltage,

convex portions defining the pixel region are provided on a surface of at least one of the substrates on the liquid crystal layer side, and a treatment for controlling a position of the axis-symmetrical alignment central axis is conducted,

each pixel region includes an Sb region in which the liquid crystal molecules keep a homeotropic alignment state under application of an axis-symmetrical alignment central axis forming voltage at each predetermined position, and

an axis-symmetrical alignment central axis forming portion at a predetermined position in each of the plurality of pixel regions, and the axis-symmetrical alignment central axis of the liquid crystal molecules corresponds to the axis-symmetrical alignment central axis forming portion,

wherein the Sb region is an area [of] aligned with the axis-symmetrical alignment central axis forming portion, A is an area of the pixel region, and Sb/A satisfies the relationship $0 < Sb/A < 4\%$.

Notice of References Cited

Application No.	Applicant(s)		
08/990,132	Yamada et al.		
Examiner	Group Art Unit	Page	
Dung Nguyen	2871		

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	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A	5,450,220	9/1995	Onishi et al.	349	89
B	5,473,450	12/1995	Yamada et al.	349	89
C	6,014,188	9/1995	Yamada et al.	349	32
D					
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NON-PATENT DOCUMENTS

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U	"Liquid Crystal: Applications and Uses", D. Coates, pp 287-288, World Scientific, vol. 1.	1990
V	"Liquid Crystal: Applications and Uses", S. Kobayashi & A. Mochizuki, pp 254-258, World Scientific, vol. 3	1992
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B	5,566,010	10/15/96	Ishii et al.	359	59
C	5,818,558	10/06/98	Ogishima	349	130
D	5,748,275	05/05/98	Sato et al.	349	144
E	5,906,527	05/25/99	Shaikh et al.	445	24
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U	Buzak, "A new Active-Matrix Technique Using Plasma Addressing", SID 90 DIGEST, pg. 420-423.	1990
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